

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 55

January, 1953

No. 649

THE ELEOCHARIS OBTUSA-OVATA COMPLEX

HENRY K. SVENSON

Eleocharis ovata has been known as an element of the Eurasian flora, and its recognition as an inhabitant of North America distinct from the ubiquitous *E. obtusa* dates from an account of the group by M. L. Fernald in 1899. His treatment, published in the Proceedings of the American Academy, was initiated by an attempt to identify more clearly the dwarf specimens of the *E. obtusa* group (Gray Exs. no. 138) collected in Purgatory Swamp at Norwood, Massachusetts, and previously determined as *E. obtusa*, *E. ovata*, *E. palustris*, *E. olivacea*, and *E. diandra*. Such differences of opinion not only show the close outward similarity of dwarfed specimens of the genus, but the difficulty encountered when plants have become established in an unusual environment, and have been so contrary as to develop stolons. These specimens finally came to rest under *E. obtusa* var. *jejuna* Fernald, a dwarf form described from North Berwick, Maine, the Purgatory specimens noted as having "spikes more elongated and tubercle narrower than in the extreme form." In RHODORA 31: 216. 1929, I observed that var. *jejuna* "seems to be an ecological phase which occurs when the plant is growing in muddy inundated places," and it was especially marked in dwarf plants forming turf in a mill pond at Weymouth, Massachusetts (coll. Fernald & Svenson in 1928), where there was a succession of flooded and dry conditions. In these specimens the small strongly biconvex achenes had acute greenish tubercles as wide as the achene, and nearly half as high. Let us return to *E. ovata*. This plant is of scattered occurrence in the greater part of central Europe (but apparently not in the British Isles) and extends eastward through Russia to Siberia and the Amur region. It has the outward

appearance of *E. obtusa*, but is inclined to be smaller in stature. The chief difference is in the relative dimensions of the tubercle, $\frac{1}{2}$ to $\frac{2}{3}$ as broad as the achene, whereas in *E. obtusa* it is nearly or quite as broad as the achene. *E. ovata* is known from scattered stations in North America from Newfoundland to Washington, usually on lake margins as a sprawling plant with purplish scales, with its greatest frequency in Maine, Vermont, and Minnesota. Within *E. ovata* I included (RHODORA 41: 43. 1939) *E. diandra*, described from sand-bars of the Connecticut River, and known from several river banks of the northeastern states and differing from *E. ovata* in the depressed tubercle, and reduced bristles. Its greatest concentration is in estuaries, where plants are subjected to alternate flooding and exposure, but it is also known from the sandy eastern margin of Oneida Lake in central New York, where the extensive sand-bars and alternating shallow water provide conditions somewhat similar to those of an estuary.

A recent reexamination by me of the type of *E. Macounii*, known from marshes near Ottawa, makes it clear that this is another of the estuarine modifications of *E. obtusa*, with narrow spikelets in which only a few achenes develop. These vary from biconvex to trigonous, with a tubercle intermediate between *E. obtusa* and *E. ovata*, and with bristles exceeding the achene.

The peculiarity of *Eleocharis* of this group in the Hudson estuary (RHODORA 31: 211. 1929, and 41: 43. 1939) has already been mentioned by me in respect to rhizome development and close resemblance to *E. ovata*. Phenomenal variations appeared in collections made by me in September, 1950, at Livingston, Columbia County, New York. The material at the upper level is normal *E. obtusa* (Svenson no. 13050A) 2-3 dm. high, with rounded spikelets and achenes 1.25 mm. long and 0.75 mm. wide, including the tubercle which is as wide as the achene. At the intermediate stage of submergence the plants (*E. diandra* 13050D) are smaller (10-15 cm. high), the culms slender, spikelets frequently lanceolate and thin-scaled, achenes 1.2 mm. long and 0.7 mm. broad, the tubercle half as broad as the achene, and most frequently acute, and bristles half as long as the achene or less. At the lowest level, plants (*E. diandra* 13050C) are re-

duced mostly to 5–6 cm., and the spikelets sometimes nearly linear, the achenes as above but bristles usually lacking. Thus there is a series reduced from *E. obtusa* accompanying the various levels. The plants with lanceolate spikelets greatly resemble those of *E. lanceolata* of Arkansas and northern Texas, but are probably not closely related and represent parallel evolution. This situation in the estuaries suggests that Eurasian *E. ovata*, with its narrowed tubercles, has been derived from North American stock, perhaps as the result of changed environmental conditions.

The *obtusa-ovata* group has tenuous limits for determination of species. In fact, all have been considered at some time as variants of the same specific complex, an opinion which may be close to reality. I have seen a few well-developed trigonous achenes in dwarf plants of *E. obtusa* (coll. B. F. Bush, Campbell, Missouri, Oct. 26, 1892), which may give a clue to ancestral forms. The tubercle is trigonous with a trilobed base, decurrent on the angles of the achene, much in the manner of *E. pachystyla* of the West Indies, Venezuela, and Colombia, and *E. viridans* of Uruguay. Probably *E. obtusa* comes from the perennial *E. pachystyla*, which it resembles in outward appearance, and the closest derivative of the complex is probably *E. Engelmanni* of the Middle Atlantic and Central States (see map 45, RHODORA 41: 75. 1939), with a low and frequently somewhat trigonous style-base tending to be decurrent on the angles. *E. monticola* of scattered distribution in the Western States, should be included (cf. RHODORA 31: 209. 1929) as a variety of *E. Engelmanni*. In the ubiquitous *E. obtusa*, stolon-like branches are occasionally produced toward the end of the growing season, and this is a common occurrence in var. *ellipsoidalis* of quagmires of the Atlantic Coastal plain. A similar condition has already been mentioned as occurring in estuary plants. Throughout its range *E. obtusa* is extremely variable in the size of plants and size and shape of spikelets, these becoming very large in the var. *gigantea* of the western coast, and also in the related *E. Engelmanni* var. *robusta* of southern Missouri. In *E. obtusa* var. *Peasei*, of pond shores in northern New England and Quebec, the achene is without bristles.

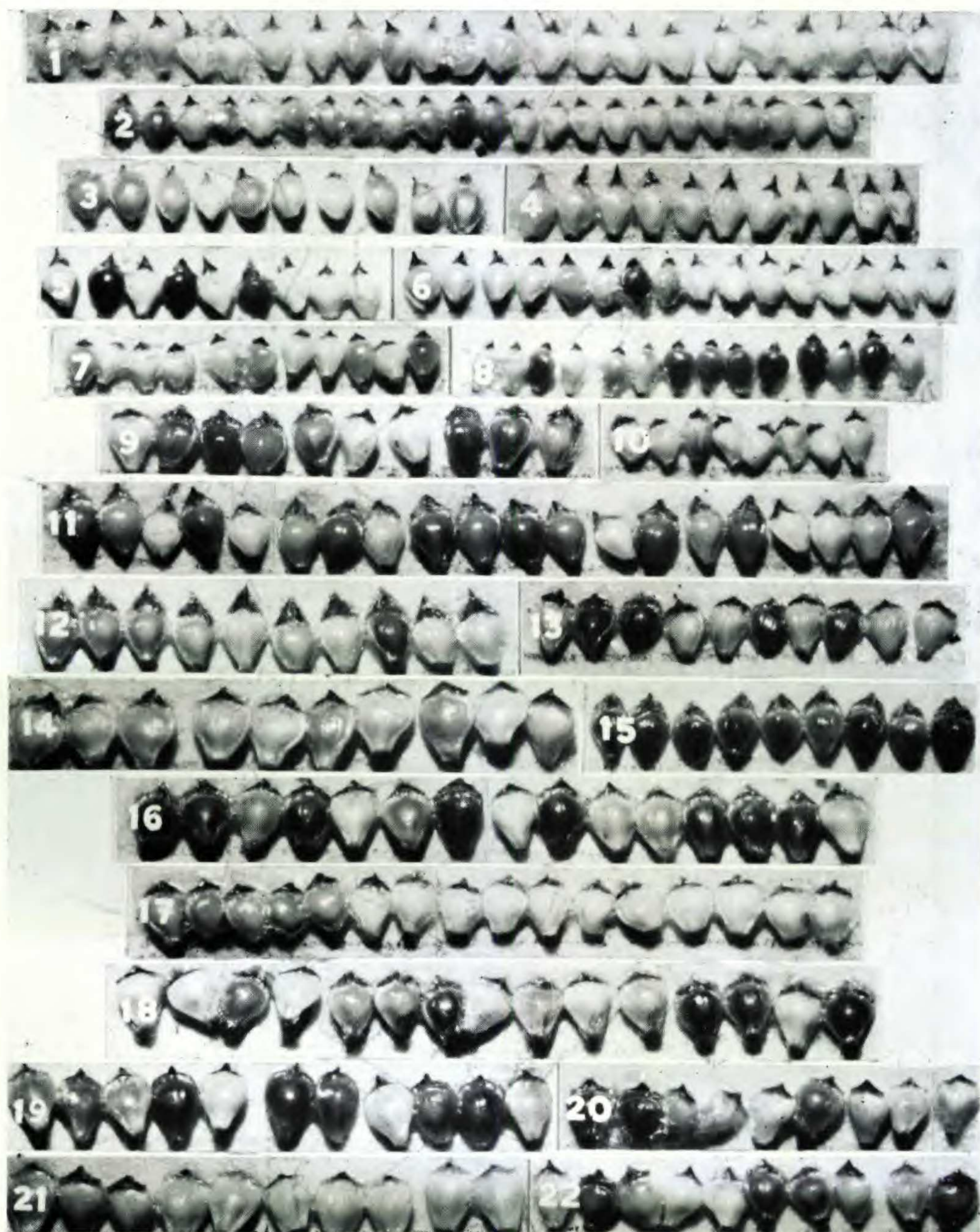
In the seventh edition of Gray's Manual (p. 180), the various species are keyed out as follows:

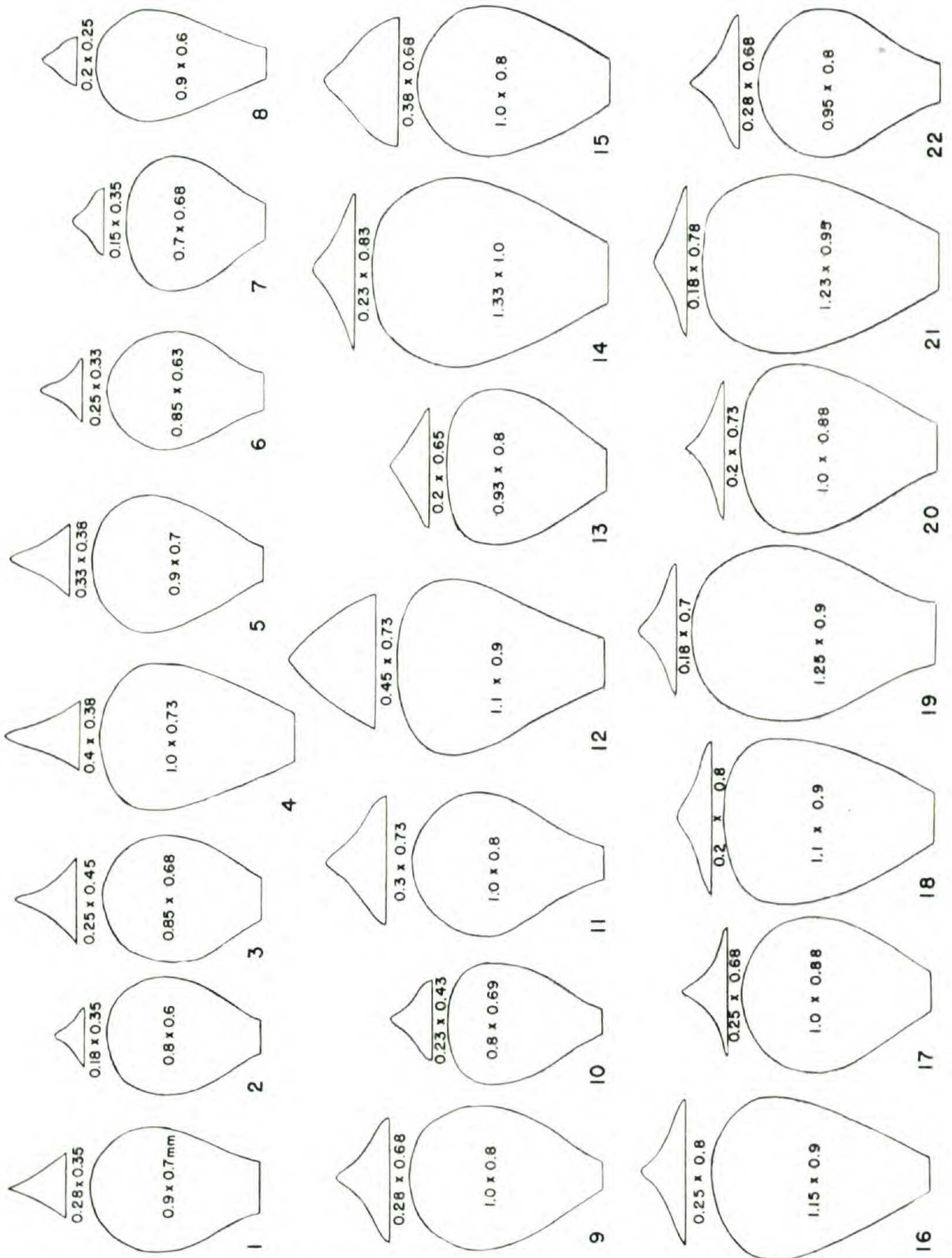
- Tubercle less than two-thirds as broad as the achene.
 Tubercle depressed turban-shaped, broader than high;
 bristles wanting or rudimentary.....*E. diandra*.
 Tubercle deltoid-conic, higher than broad; bristles much
 exceeding the achene.....*E. ovata*.
 Tubercle nearly or quite as broad as the achene.
 Tubercle depressed-conic, concaved toward the tip, one-
 third as high as the achene; bristles much exceeding the
 achene.....*E. obtusa*.
 Tubercle flat-deltoid, with straight sides, one-fourth as high
 as the achene; bristles scarcely or not at all exceeding the
 achene.....*E. Engelmanni*.

Species in this group have been differentiated on the somewhat arbitrary basis of style-base dimensions in relation to the size of the achene, as may be noted in the cited key to species. Skottsberg (Acta Hort. Gotoburg. **15**: 304-5, figs. 137-147. 1944), in a discourse on Hawaiian material, believes that the difference in width of tubercle (style-base) between *E. obtusa* and *E. ovata* is not so pronounced, and that difference in size of achenes is more decisive. He gives the following figures: for *obtusa* 1.4-1.7 (commonly 1.5) x 0.8-0.9 mm.; for *ovata* 0.9-1.2 (commonly 1-1.1) x 0.6-0.7 (rarely over 0.65) mm.

Though the great mass of specimens of the *E. obtusa* group can readily be determined without trouble, difficulties arise where the variations come in contact, or occur in unusual environments. These annual species of *Eleocharis* can be grown

EXPLANATION OF PLATE—Fig. 1, *ELEOCHARIS OVATA* *Lakela* 1731, Duluth, Minnesota; 2, *E. OVATA* *Vailleau* 330, France; 3, *E. OBTUSA* var. *JEJUNA* *Gray Exs.* 438, Weymouth, Massachusetts; 4, *E. OBTUSA* *Lakela* 89, Anoka Co., Minnesota, normal *E. OBTUSA*; 5, *E. OVATA* *Fernald & Wiegand* 4696, Rushy Pond, Newfoundland, spikelets rounded to elongate; 6, *E. OVATA* *Ziegler* in 1907, Saxony; 7, *E. DIANDRA* *Bissell*, East Windsor, Connecticut in 1899; 8, *E. DIANDRA* *Haberer* 1356, Oneida Lake, New York; 9, *E. OBTUSA* *Cooper* 89, Anoka County, Minnesota, typical *E. obtusa*; 10, *E. OVATA* *Suksdorf* 2328, Clarke Co., Washington, typical *E. ovata*; 11, *E. OBTUSA* *Hermann* 9949, Bowie, Maryland, typical *E. obtusa*; 12, *E. OBTUSA* var. *GIGANTEA* *Macoun* in 1893, New Westminster, British Columbia; 13, *E. OBTUSA* *Bickell* 942, Valley Stream, Long Island, New York, small spikelets; 14, *E. ENGELMANNI* var. *ROBUSTA* *Demaree* 17714, Logan Co., Arkansas; 15, *E. OBTUSA* var. *ELLIPSOIDALIS* *Fernald & Long* 7331, Caprom, Virginia; 16, *E. ENGELMANNI* *Steyermark* 22780, Taney Co., Missouri, unusually high tubercles; 17, *E. OBTUSA* *Gray Exs.* 138, Norwood, Massachusetts; 18, *E. ENGELMANNI* *Metcalf* 589, Socorro Co., New Mexico; 19, *E. ENGELMANNI* *Svenson* in 1916, Birch Pond, Saugus, Massachusetts; 20, *E. ENGELMANNI* *Kildahl*, Maza, North Dakota; 21, *E. ENGELMANNI* *Shreve* 1587, Dorchester Co., Maryland; 22, *E. ENGELMANNI* *Rosendahl & Johnson*, Anoka Co., Minnesota in 1917.





Outlines of achene-body and tubercle representing average dimensions of individual collections shown in Plate 1188.